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(54) Parallel hinge assembly positioning system

(57) A parallel hinge assembly positioning system (10) and an extension member are disclosed for positioning two or more adjacent parallel hinge modules (12A,12B) mounted to a structure (18). The parallel hinge modules (12A,12B) support a sash of a vent of a structure (18).

Each parallel hinge comprises a pair of parallel tracks (14A,16A;14B,16B). One of the tracks being a fixed track (16A;16B) that is mounted to the structure (18), the other track (14A;14B) being moveable in such that it remains in a substantially parallel plane relative to the fixed track (16A;16B). A pair of diagonally crossing links (20A,22A;20B,22B) are also provided that are pivotally coupled to each of the tracks (14A,16A;14B, 16B) and to each other.

The parallel hinge assembly alignment system (10) further includes a drive track (40) mounted to the structure (18), which extends between the adjacent parallel hinge modules (12A,12B). A drive member (38A;38B) for each parallel hinge module (12A;12B) is located in the drive track (40) and is pivotally coupled to one of the pair of diagonally crossing links (20A,22A;20B,22B) of the parallel hinge module (12A;12B). The drive member (38A;38B) is capable of movement along the drive track (40) to move the coupled link (20A,22A;20B,22B) and thereby actuate movement of the moveable track (14A; 14B) relative to the fixed track (16A;16B).

An extension member (42A;42B) is provided, which provides coupling between one or more drive members (38A,38B,38C) in the drive track (40). The length of coupling between the pair of drive members (38A,38B,38C) can be adjusted to align the sash supported by the parallel hinge modules (12A,12B) over the vent.

EP 1 288 417 A2

Description

[0001] The invention relates to a parallel hinge assembly positioning system for positioning two or more adjacent parallel hinges that can be mounted to a structure.

[0002] Parallel hinge assemblies are used for providing support to a sash (such as a window) of a vent of a structure such as a building. Each parallel hinge assembly includes two or more parallel hinge modules that are adjacent to each other. The parallel hinge modules are coupled to and driven by a common drive track that forms a part of the assembly and is mountable to the structure.

[0003] A prior art parallel hinge of a parallel hinge module is disclosed in Applicant's prior European patent application no. EP-A-0968349. The parallel hinge includes a pair of parallel tracks, one of the tracks being a fixed track that can be mounted to a window frame, the other track being moveable in a substantially parallel plane relative to the fixed track. The parallel tracks are connected by a pair of diagonally crossing links that are pivotally connected to each track and to each other. Each of the tracks accommodates a sliding shoe that carries a pivot connected to a respective link.

[0004] To open and close the sash that covers the vent, the moveable track is moved relative to the fixed track. To permit movement of the moveable track, the drive track is mounted to the frame and between the parallel tracks. The drive track includes a drive member that is able to travel along the drive track. The drive track is actuated by a drive means, such as a switch-operated motor or a hand driven ratchet mechanism, to move the sliding shoe and thereby actuate movement of the moveable parallel tack relative to the fixed track.

[0005] Some sashes may be very large, requiring the use of two or more adjacent parallel hinge modules to support adequately the sash. In the course of installing two adjacent parallel hinge modules it is important that they are properly spaced in order to position the sash over the vent opening. Accordingly, in the past, the two parallel hinge modules have been joined to the common drive member having a length predetermined by the size of the vent opening. Thus, it has been necessary for the manufacturer to manufacture and stockpile a large number of two hinge parallel hinge assemblies with drive members of different lengths to ensure that the market place can be adequately and promptly supplied when necessary.

[0006] The distance between the two parallel hinge modules that support the sash will be dictated by the size of the vent, which as previously mentioned varies according to the particular installation. Prior to the present invention, parallel hinge assemblies have been mass-produced as single units. Consequently, the distance between the parallel hinge modules of a parallel hinge assembly has been set at the point of manufacture. This has required the manufacture of a large number of parallel hinge assemblies having parallel hinge modules fixed at different lengths to thereby accommodate different sized sashes. However, it would be more convenient and cheaper if the parallel hinge assemblies could be manufactured to accommodate a range of vent sizes.

[0007] It can also be difficult to properly position the parallel hinge modules when they are installed so that the parallel hinge assembly aligns the sash over the vent opening.

[0008] With the foregoing in mind, one aim of the present invention is to provide a positioning system for two parallel hinge modules. Another aim of the invention is to provide an extension member for use in a positioning system for two parallel hinges.

[0009] According to one broad aspect of the invention, there is provided a parallel hinge assembly positioning system for positioning two or more adjacent parallel hinges adapted to be mounted to a structure, said parallel hinges being adapted to support a sash of a vent, each parallel hinge comprising:

a first track adapted to be mounted to said structure and a second parallel track coupled to said first track and capable of supporting at least a portion of said sash;
the parallel hinge assembly positioning system comprising:

a drive track having a drive member adapted to slide along said drive track, said drive member being adapted to communicate with said two parallel hinges to move said sash away from and toward said structure; and
an extension member positioned between two portions of said drive member, wherein said extension member dictates the distance between said two drive member portions, thereby defining relative positions of said parallel hinges.

[0010] According to another broad aspect of the invention, there is provided an extension member for positioning two adjacent parallel hinge assemblies adapted to be mounted to a structure, said parallel hinges being capable of supporting a sash of a vent, each parallel hinge comprising:

a first track adapted to be mounted to said structure and a second parallel track coupled to said first track and capable of supporting at least a portion of said sash;
the parallel hinge assemblies comprising:

a drive track having a drive member adapted to slide along said drive track, said drive member being adapted to communicate with said two parallel hinges to move said sash away from and toward said structure;

wherein in use said extension member is positioned between two portions of the said drive member, and wherein said extension member dictates the distance between said two drive member portions, thereby defining relative positions of said parallel hinges.

[0011] Preferably the extension member comprises an alignment member, which may allow the length of the extension member to be adjusted.

[0012] The alignment member may be a threaded bolt. The bolt may include an engaging head on one end of its shaft and a nut may engage the bolt.

[0013] Optionally, the two drive member portions are substantially flat with connecting arms extending from their respective adjacent ends. A socket may extend through each connecting arm and one of the sockets of the adjacent connecting arms is tapped. In use, the sockets are in alignment and the bolt engages said tapped socket.

[0014] Rotation of the bolt can adjust the spacing between the connecting arms.

[0015] The drive track may include an intermediate drive member portion between two drive track portions.

[0016] The second track may include a keep adapted to engage an abutment when said sash is moved toward said structure.

[0017] The parallel tracks may be coupled by a pair of diagonally crossing links that are pivotally coupled to each of the tracks and to each other. Each of the crossing links may have an end which slides along one of the first and second tracks. One of the crossing links may be pivotally coupled to the drive track.

[0018] The first and second tracks and said drive track may be substantially C-shaped in cross-section.

[0019] Optionally, a third parallel hinge is located between said two parallel hinges.

[0020] A specific embodiment of the invention is now described, by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a schematic side sectional view of a preferred embodiment of a positioning system for a parallel hinge assembly; and

Figure 2 is a schematic side sectional view along the line B-B in Figure 1 showing an extension member used in the positioning system.

[0021] With reference to Figure 1, there is shown a parallel hinge assembly system 10. An advantage of the system 10 is that it can be used to fix the distance between the parallel hinge modules 12A and 12B to thereby support a sash of a particular size, which covers the opening of a vent of a structure (not shown). As will be explained further below, the distance between the hinges can be fixed following manufacture of the hinge modules and therefore the manufacturer does not have to produce and store a large number of pairs of parallel hinge modules with drive members of different lengths for later use.

[0022] The moveable tracks 14A, 14B of the respective modules 12A, 12B are respectively parallel to fixed tracks 16A, 16B, which are fixed to a frame 18 (shown by dashed lines) that is attached to the structure and which extends around the vent.

[0023] The fixed tracks 16A, 16B are fixed to the frame 18 while the moveable tracks 14A, 14B are moveable whilst remaining parallel to the respective fixed tracks 16A, 16B, in a direction perpendicular to the fixed tracks, as will be described further below.

[0024] The construction of parallel hinge module 12A will now be described in detail. It should of course be realised that the description of this parallel hinge module is applicable to the corresponding parallel hinge module 12B, which has like reference numerals marked 'B'.

[0025] Referring to parallel hinge module 12A, the moveable track 14A is connected to fixed track 16A by a pair of crossing links 20A and 22A. A central pivot 24A connects the crossing links 20A and 22A to each other. The crossing links 20A and 22A couple the moveable track 14A to the fixed track 16A by pivots 26A, 32A, 28A and 30A.

[0026] The pivots 26A and 32A are respectively connected to sliding shoes 34A and 33A, which are able to slide within the tracks 14A, 16A in the direction of arrow 36, thereby allowing the moveable track 14A to move relative to the fixed track 16A whilst remaining substantially parallel thereto. The tracks 14A, 16A are c-shaped in cross-section to accommodate the sliding shoes as is known in the art.

[0027] The parallel hinge modules 12A, 12B are manufactured from cold-rolled stainless steel.

[0028] To actuate movement of the moveable track 14A, a longitudinal drive member 38A is located in a drive track 40 (or 'middle track'), which is also substantially c-shaped in cross-section and is substantially flat. In the present embodiment, three drive members 38A, 38B and 38C are located within the drive track 40.

[0029] With reference to the parallel hinge module 12A, the drive member 38A is coupled to the link 22A via a pivot 42A. This allows the drive member 38A to move within the drive track 40 and thereby move the parallel hinge module 12A in the direction of arrow 36 by action of a suitable drive means, such as an electric motor that is activated by a switch or by a hand-driven ratchet mechanism.

[0030] To provide some idea of the scale of the present embodiment, the length of the moveable track 14A is 618mm (24.3 in), the length of the moveable track 14B is 613.5mm (24.15in) and the length of the fixed tracks 16A and 16B is 475mm (18.7in). The length of the drive member 38A is 665.5mm (26.2in), the length of drive member 38B is 780mm (30.7in) and the length of intermediate drive member 38C is 315.5mm (12.4in).

[0031] The parallel hinge modules 12A, 12B are usually supplied in standard size modules, the dimensions of which may vary.

[0032] As the two parallel hinge modules 12A, 12B

can be attached to the drive track 40 at a distance fixed by the manufacturer, it is possible for the parallel hinge modules 12A, 12B to accommodate a number of different sized sashes by varying the distance between the parallel hinge modules.

[0033] Referring to Figure 1, the effective spacing length of the drive members 38A, 38B, 38C is denoted by distance 'X'. If a small sized sash needs to be fitted about the vent, then the distance 'X' between the parallel hinge modules 12A, 12B can be reduced. Likewise, if a large sized sash needs to be fitted about the vent, then the distance 'X' between the parallel hinge modules 12A, 12B can be increased. The manufacturer simply has to alter the length of drive member 38C to fix the distance 'X'. The manufacturer does not therefore have to produce and store a large number of assemblies with parallel hinge modules pre-set at a range of fixed distances.

[0034] The manufacturer can mass-produce the single hinge modules, without having to set the distance 'X' between the modules 12A, 12B until the manufacturer receives an order for a parallel hinge assembly to accommodate a particular sized sash. Once the order is received, the manufacturer selects an intermediate drive member 38C of a required length. This results in lower production costs for the manufacturer and allows the manufacturer to maintain a reduced amount of inventory..

[0035] Another advantage of the positioning system is that it provides a convenient alignment system for the sash during installation. If for example two parallel hinge modules support a sash on a wall, with one of the parallel hinge modules located below the other parallel hinge module, the weight of the sash may displace the lower parallel hinge module relative to the other. This displacement may displace the sash from proper alignment with the vent opening and prevents smooth running of the two hinges together. The positioning system 10 overcomes this alignment problem by allowing the distance between the drive members within drive track to be adjusted during installation so that the distance between the parallel hinge modules 12A, 12B can be precisely adjusted to thereby correctly align the sash over the vent opening. By ensuring that the drive track 40 has the correct length, the parallel hinge modules 12A, 12B can move smoothly in concert and thereby enable the sash to cover the vent when the drive members are actuated.

[0036] In order to adjust the spacing between the parallel hinge modules during installation, extension members 42A, 42B are respectively connected between the adjacent drive members 38A/38C and 38C/38B. Referring to Figure 2, there is shown a schematic side sectional view of extension member 42A that connects drive members 38A and 38C.

[0037] As shown in Figure 2, connecting arms 43A, 43C respectively project from the ends of the members 38A, 38C. Each of the connecting arms 43A, 43C have mutually aligned sockets 44A, 44C, which allow an extension member comprising an adjustment member in the form of threaded bolt 46 to be inserted therethrough. The socket 44A is tapped so that an end of the thread of the bolt 46 is able to engage with it. The extension member further comprises a hexagonal head 48 located on the other end of the bolt 46 and a nut 50 screwed onto the threaded bolt shaft between the connecting arms 43A, 43C.

[0038] The shaft of bolt 46 is first inserted through socket 44C so that the nut 50 can be wound onto the thread. The shaft is then rotated to engage the tapped socket 44A.

[0039] The nut 50 locks the head 48 against the connecting arm 43C to keep the bolt 46 in locked position. The bolt 46 is unlocked by turning the nut 50 away from the head 48.

[0040] Variable 'Y' represents the spacing between the connecting arms 43A and 43C. The spacing between the drive members 38A, 38C can be varied by the installer. To vary the spacing Y, the installer turns nut 50 so that the bolt 46 is not in the locked position. In the unlocked position the head 48 can be rotated to turn the threaded part of the bolt that engages the connecting arm 43A. When the head 48 is rotated in the clockwise direction, the connecting arms 43A and 43C are bought closer together. When the head 48 is rotated in the anticlockwise direction, the connecting arms 43A and 43C are spaced further apart.

[0041] When the connecting arms 43A and 43C are spaced at a required distance, such that the parallel hinge modules 12A and 12B function smoothly in synchronous concert so that the sash is correctly aligned over the vent opening, the nut is then threaded onto the thread adjacent the head 48 until it locks with connecting arm 43C.

[0042] Referring again to Figure 1, as mentioned previously the effective spacing length of the drive members 38A, 38B, 38C is denoted by line 'X'. The distance between each of the drive members 38A and 38B and the extension member 38C can be varied by about 12mm (about 0.472 inches). Therefore the total overall effective spacing length X of the drive members can be varied by about 24mm (0.945 inches).

[0043] Locking rollers 52A, 52B are provided on drive members 38A, 38B so that after the parallel hinge modules 12A and 12B have been properly spaced, they can roll along corresponding respective keep plates 54A and 54B, which are made of metal. The keep plates 52 are provided on the moveable tracks 14A and 14B. The keep plates 52A, 52B provide an engagement means for when the sash is in a closed position over the vent.

[0044] The number of drive members may be varied so that more than two extension members are provided within the drive track, thereby enabling the overall adjustment of length X to be varied by a greater amount than 50mm (2in).

[0045] In other embodiments, only one drive member

comprising plurality of separate drive member portions may be located in the drive track 40. Furthermore, it will be appreciated that in other embodiments of the invention, three parallel hinge modules may be installed side-by-side and the overall length of the drive members to which they are attached can be varied by increasing the number of extension members within the drive track.

Claims

1. A parallel hinge assembly positioning system for positioning two or more adjacent parallel hinges adapted to be mounted to a structure, said parallel hinges being adapted to support a sash of a vent, each parallel hinge comprising:

   a first track adapted to be mounted to said structure and a second parallel track coupled to said first track and capable of supporting at least a portion of said sash;
   the parallel hinge assembly positioning system comprising:

   a drive track having a drive member adapted to slide along said drive track, said drive member being adapted to communicate with said two parallel hinges to move said sash away from and toward said structure; and
   an extension member positioned between two portions of said drive member, wherein said extension member dictates the distance between said two drive member portions, thereby defining relative positions of said parallel hinges.

2. A positioning system as claimed in claim 1, wherein the extension member comprises an alignment member.

3. A positioning system as claimed in claim 2, wherein the alignment member allows the length of the extension member to be adjusted.

4. A positioning system as claimed in claim 3, wherein the alignment member is a threaded bolt.

5. A positioning system as claimed in claim 4, wherein the bolt includes an engaging head on one end of its shaft.

6. A positioning system as claimed in claim 4 or claim 5, wherein a nut engages said bolt.

7. A positioning system as claimed in any one of claims 1 to 6, wherein said two drive member portions are substantially flat with connecting arms extending from their respective adjacent ends.

8. A positioning system as claimed in claim 7, wherein a socket extends through each connecting arm.

9. A positioning system as claimed in claim 8, wherein one of said sockets of said adjacent connecting arms is tapped.

10. A positioning system as claimed in claim 9, when dependent on any one of claims 4 to 5, wherein when said sockets are in alignment, the threaded bolt engages said tapped socket.

11. A positioning system as claimed in claim 10, wherein rotation of said bolt adjusts the spacing between said connecting arms.

12. A positioning system as claimed in any one of claims 1 to 11, wherein the drive track includes an intermediate drive member portion between two drive track portions.

13. A positioning system as claimed in any one of claims 1 to 12, wherein said second track includes a keep adapted to engage an abutment when said sash is moved toward said structure.

14. A positioning system as claimed in any one of claims 1 to 12, wherein said parallel tracks are coupled by a pair of diagonally crossing links that are pivotally coupled to each of the tracks and to each other.

15. A positioning system as claimed in claim 14, wherein each of said crossing links have an end which slides along one of the first and second tracks.

16. A positioning system as claimed in any one of claims 14 or 15, wherein one of said crossing links is pivotally coupled to said drive track.

17. A positioning system as claimed in any one of claims 1 to 16, wherein said first and second tracks and said drive track are substantially C-shaped in cross-section.

18. A positioning system as claimed in any one of claims 1 to 17, wherein a third parallel hinge is located between said two parallel hinges.

19. An extension member for a parallel hinge assembly positioning system, the positioning system capable of positioning two adjacent parallel hinge assemblies adapted to be mounted to a structure, said parallel hinges being capable of supporting a sash of a vent, each parallel hinge comprising:

a first track adapted to be mounted to said structure and a second parallel track coupled to said first track and capable of supporting at least a portion of said sash;
the positioning system comprising:

a drive track having a drive member adapted to slide along said drive track, said drive member being adapted to communicate with said two parallel hinges to move said sash away from and toward said structure;

wherein in use said extension member is positioned between two portions of the said drive member, and wherein said extension member dictates the distance between said two drive member portions, thereby defining relative positions of said parallel hinges..

20. An extension member as claimed in claim 19, wherein the extension member comprises an alignment member.

21. An extension member as claimed in claim 20, wherein the alignment member allows the length of the extension member to be adjusted.

22. An extension member as claimed in claim 21, wherein the alignment member is a threaded bolt.

23. An extension member as claimed in claim 22, wherein the bolt includes an engaging head on one end of its shaft.

24. An extension member as claimed in claim 22 or claim 23, wherein a nut engages said bolt.

25. An extension member as claimed in any one of claims 19 to 24, wherein said two drive track portions are substantially flat with connecting arms extending from their respective adjacent ends.

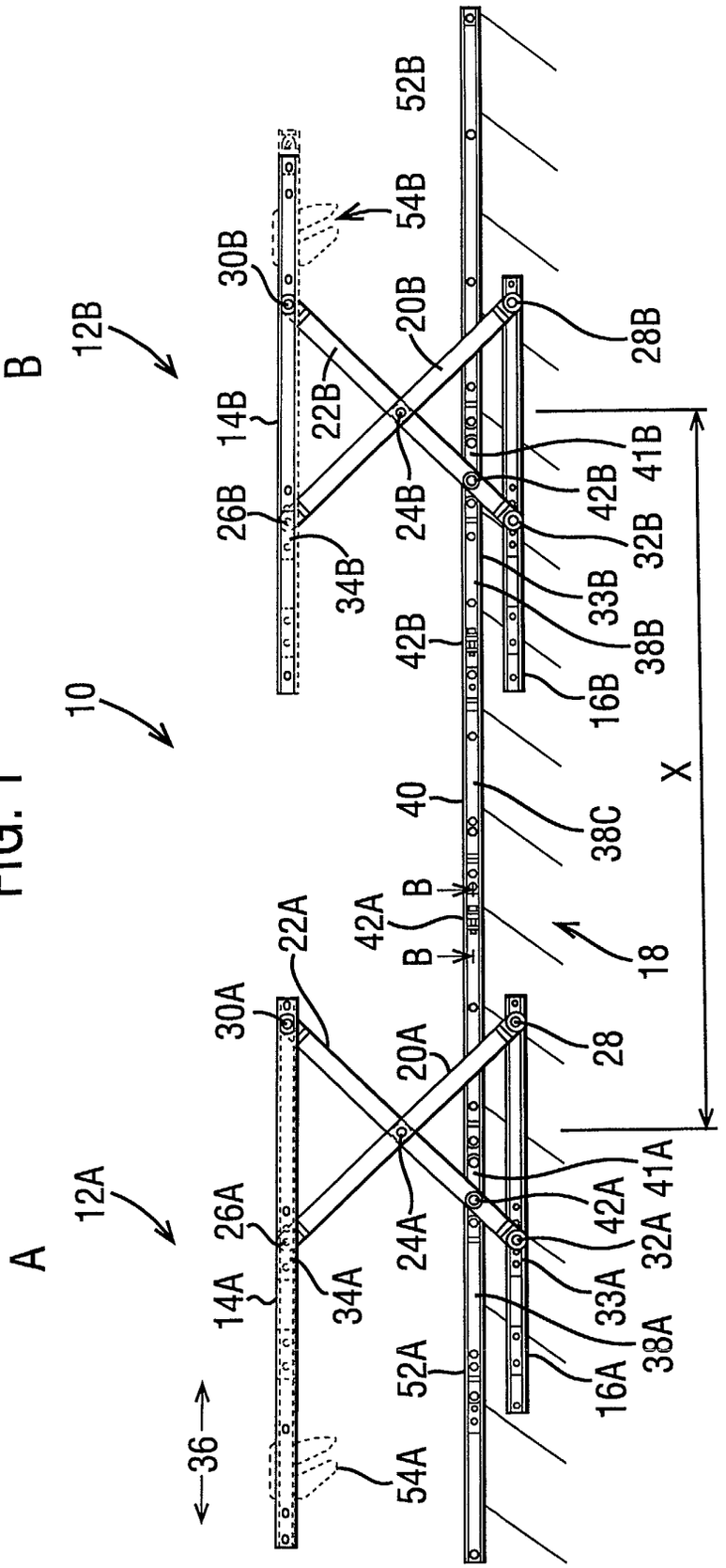
26. An extension member as claimed in claim 25, wherein a socket extends through each connecting arm.

27. An extension member as claimed in claim 26, wherein one of said sockets of said adjacent connecting arms is tapped.

28. An extension member as claimed in claim 27 when dependent on claim 22, wherein when said sockets are in alignment, the bolt engages said tapped socket.

29. An extension member as claimed in claim 28, wherein rotation of said bolt adjusts the spacing between said connecting arms.

FIG. 1


A
B
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12A
12B
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14B
16A
16B
18
20A
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28
28B
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33A
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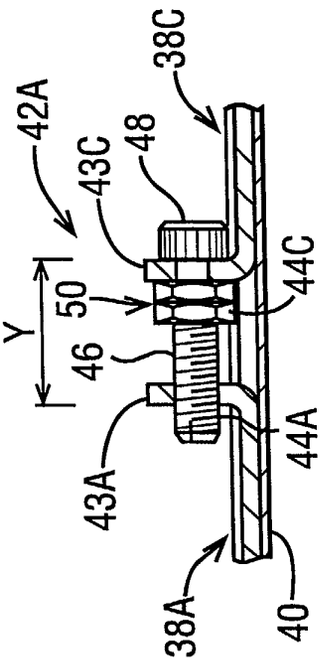
Y
38C
42A
43C
48
50
44C
46
43A
44A
38A
40

FIG. 2